

WHAT IS CLAIMED IS:

1. A plasma processing apparatus comprising:
 - a vacuum processing chamber;
 - a pair of electrodes opposite to each other in said vacuum processing chamber, one of the electrodes being used also as a sample table capable of holding a sample which includes an insulator film;
 - a plasma generating means including said pair of electrodes;
 - an electrostatic adsorption film arranged at the electrode used as said sample table to cause a thermal conductive gas to be supplied between said film and a rear surface of said sample; and
 - a pressure reducing means for reducing a pressure within said vacuum processing chamber,
- wherein the apparatus includes:
 - a means for setting a gas pressure within said vacuum processing chamber to 0.5 to 4.0 Pa;
 - a high frequency power supply for applying a high frequency electric power of 30 MHz to 200 MHz between said pair of electrodes;
 - an electrode cover disposed at the other electrode of said pair of electrodes with a clearance between said pair of electrodes being 30 mm to 100 mm;
 - a gas introducing means having fine plural apertures provided at said electrode cover so as to introduce a fluorine-containing etching gas to said vacuum processing chamber; and
 - a power supply for accelerating ions in a plasma connected to said one electrode.

2. A plasma processing apparatus comprising:

- a vacuum processing chamber;
- a pair of electrodes opposite to each other in said vacuum processing chamber, one of the electrodes being used also as a sample table capable of holding a sample which includes an insulator film and having a diameter of 300 mm or more;
- a plasma generating means including said pair of electrodes;
- an electrostatic adsorption film arranged at the electrode used as said sample table to cause a thermal conductive gas to be supplied between said film and a rear surface of said sample; and
- a pressure reducing means for reducing a pressure within said vacuum processing chamber,

wherein the apparatus includes:

- a means for setting a gas pressure within said vacuum processing chamber to 0.5 to 4.0 Pa;
- an electrode cover disposed at the other electrode of said pair of electrodes with a clearance between said pair of electrodes being 30 mm to 60 mm;
- a gas introducing means having fine plural apertures provided at said electrode cover so as to introduce a fluorine-containing etching gas to said vacuum processing chamber;
- a high frequency power supply for applying a high frequency electric power of 30 MHz to 200 MHz to said pair of electrodes to form said introduced gas into a plasma; and
- a power supply for accelerating ions in a plasma connected to said one electrode.

3. A plasma processing apparatus comprising:

- a vacuum processing chamber;
- a pair of electrodes opposite to each other in said vacuum processing chamber, one of the electrodes being used also as a sample table capable of holding a sample which includes an insulator film and which has a diameter of 300 mm or more;
- a plasma generating means including said pair of electrodes;
- an electrostatic adsorption film arranged at the electrode used as said sample table to cause a thermal conductive gas to be supplied between the film and a rear surface of said sample; and
- a pressure reducing means for reducing a pressure within said vacuum processing chamber,

wherein the apparatus includes:

- a means for setting a gas pressure within said vacuum processing chamber to 0.5 to 4.0 Pa;
- an electrode cover disposed at the other electrode of said pair of electrodes with a clearance between said pair of electrodes being 30 mm to 60 mm;
- a gas introducing means having fine plural apertures provided at said electrode cover so as to introduce a fluorine-containing etching gas to said vacuum processing chamber;
- a high frequency power supply for applying a high frequency electric power of 30 MHz to 200 MHz to said pair of electrodes to form said introduced gas into a plasma;
- a power supply for accelerating ions in a plasma connected to said one electrode; and

a susceptor cover comprising a material containing Si or C located near said sample.